Preface

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Biographical notes: Yiu-ming Cheung is a Full Professor at the Department of Computer Science in Hong Kong Baptist University. He received his PhD at the Department of Computer Science and Engineering from the Chinese University of Hong Kong. His current research interests focus on artificial intelligence, visual computing, and optimisation. He is the Founding and Past Chairman of Computational Intelligence Chapter of IEEE Hong Kong Section. Also, he is an Associate Editor of IEEE Transactions on NNLS, Knowledge and Information Systems, among others. He is a senior member of IEEE and ACM.

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Nowadays, a variety of internet-based applications are facing the different kinds of Information Security (IS) problems. Undoubtedly, the techniques in the field of computational intelligence (CI) provide a promising tool to solve such security problems. Therefore, it is a necessary and urgent task to cross-fertilise ideas and integrate the techniques of CI and IS. Accordingly, this special issue aimed to solicit papers that work on advanced models, theories, algorithms and applications in all areas of CI and IS.

The International Conference on Computational Intelligence and Security (CIS) is a major annual event to bring together researchers, engineers, developers and practitioners from academia and industry working in all areas of two crucial fields in information processing, i.e., CI and IS, to share their experience and exchange and cross-fertilise ideas. Accordingly, several high-quality accepted CIS'11 papers were further selected and extended for consideration for this special issue. After a strict peer review, four papers were finally accepted and included in this special issue. They are:

- achieving cooperation with many prisoners in the NIPD

- factors important for good visualisation of time series

- a fast evolutionary algorithm with searching preference

- an improved uniform design-based genetic algorithm for multi-objective bilevel convex programming.

The first paper empirically investigates the N-person's iterated prisoners' dilemma (NIPD), which is a standard problem from game theory. Through using the cross entropy method and reinforcement learning, the cooperation with much greater sizes of population can be achieved in comparison with the one using genetic algorithms and

artificial immune systems. Experimental results have given some insight into the circumstances where cooperation might develop. The second paper focuses on a minimal architecture echo state machine in the context of visualisation of multivariate time series data, and discusses three factors that may affect the capability of the network, i.e., structure, size and sparsity. It is shown that, of these three factors, the most crucial is the size of the reservoir of neuros. The third paper proposes a fast evolutionary algorithm with searching preference. The basic idea is that the better an individual is, the more resources are invested to search the region close to the individual. It is shown that this algorithm converges to a global optimum in probability.

Experiments have shown the efficacy of this algorithm in comparison with the existing counterparts. Finally, the last paper studies a multi-objective bilevel convex programming (MOBCP) problem. To deal with this problem effectively, the lower level is transformed into a single optimisation problem by multiplying weighted vector, where the weight vector is generated by the scheme of uniform design. Subsequently, an improved genetic algorithm with the uniform design is proposed for the MOBCP problem. Empirical studies have shown its promising results.

In summary, these four papers will surely provide readers with some useful ideas in the fields of CI and security.